

## ***Hyla reinwardtii* Schlegel, 1840 as a nomen protectum**

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**Following article 23.9.1 of the International Code of Zoological Nomenclature, the nomen *Rhacophorus moschatus* Kuhl & Van Hasselt, 1822 should be considered a nomen oblitum and the nomen *Hyla reinwardtii* Schlegel, 1840, its junior subjective synonym, should be treated as the valid nomen of the Reinwardt's Gliding Frog. In order to demonstrate the large acceptance of the nomen *Rhacophorus reinwardtii*, we provide a list of references using this nomen as valid. A lectotype is designated for *Hyla reinwardtii* Schlegel, 1840 and its description and figure are provided.**

South east Asia is one of the hot-spot areas of amphibian biodiversity (STUART et al., 2004). Many groups of frogs of this region have not been revised recently, and in those which were so many new species were described (e.g. VIETH et al., 2001; BROWN & GUTTMAN, 2002; OHLER, 2003). As many old scientific names or *nomina* (DUBOIS, 2000) are "sleeping" in the synonymies of many species, in order to link new results of research to previous knowledge, reliable nomenclatural work should be done prior to naming new taxa.

We have shown on several occasions how useful the Principle of Priority is for automatic determination of the valid nomen of a taxon in case of synonymy (DUBOIS & OHLER, 1995, 1997, 1999, 2000; DUBOIS, 1995, 1998; OHLER & DUBOIS, 1999; BOSSUYT & DUBOIS, 2001). We expressed our disagreement with some of the decisions of the International Commission on Zoological Nomenclature giving precedence to a nomen that had been used only in a few more publications than a senior synonym, although in some of these cases "usage" of the protected nomen had been limited to specialised taxonomic publications (DUBOIS, 2005a-c). We always strongly insisted and continue to insist that such cases should not be concerned by reversal of precedence as they only tend to weaken the legislative value and strength of the *Code* in the eyes of zoologists and thus contribute to spreading arbitrary and chaos in zoological nomenclature. Nevertheless there are cases when such an act is a reasonable one. In the edition of the *Code* currently in force (ANONYMOUS, 1999), Article 23.9 gives rules for reversal of precedence in such cases.

DUBOIS (1982, 1989) pointed to some problems in relation to the genus-group nomen *Rhacophorus* Kuhl and Van Hasselt, 1822 and the species-group nomina *Rhacophorus mos-*

*chatus* Kuhl & Van Hasselt, 1822 and *Hyla reinwardtii* Schlegel, 1840. When creating the genus-group nomen *Rhacophorus* for large tree-frogs from Java, KUHLE & VAN HASSELT (1822a) referred two specific nomina to this genus. The first nomen, *Rhacophorus reinwardtii*, was not accompanied by any description, definition or indication, and consequently must be considered a nomen nudum (DUBOIS, 1989). This specific nomen became only available in the work of SCHLEGEL (1840) who figured this tree-frog species as *Hyla reinwardtii*. The second specific nomen proposed by KUHLE & VAN HASSELT (1822a), *Rhacophorus moschatus*, was accompanied by a very short indication (“dewijl zij eenen sterken Bisamreuk zeer ver verspreidt”, i.e., “because it spreads a strong musky scent very far”) which is sufficient to make the nomen *moschatus* nomenclaturally available as of KUHLE & VAN HASSELT (1822a). This nomen being the only available specific epithet associated with the generic nomen *Rhacophorus* in the original description of the genus, *Rhacophorus moschatus* Kuhl & Van Hasselt, 1822 is the type-species by monotypy of *Rhacophorus* Kuhl & Van Hasselt, 1822 (DUBOIS, 1989).

The status of the species group nomina *Rhacophorus moschatus* Kuhl & Van Hasselt, 1822 and *Hyla reinwardtii* Schlegel, 1840 remains to be dealt with BRONGERSMA (1942) gave arguments to support the opinion that *Rhacophorus moschatus* was proposed for a juvenile of the species known as *Rhacophorus reinwardtii*. If this is true, the two species-group nomina are synonymous, and the valid nomen should be the senior one. But the junior synonym, *Hyla reinwardtii*, has been widely used in the combination *Rhacophorus reinwardtii*, and, to our knowledge, *Rhacophorus moschatus* has never been used as a valid nomen. Application of the Principle of Priority would lead to disturbance of a usage established for almost 200 years, including in popular and non-specialised taxonomic literature. The case was submitted to the International Commission on Zoological Nomenclature 20 years ago (DUBOIS, 1989: 101), but despite the rare clarity of the case this application was never published in the *Bulletin of Zoological Nomenclature* and no vote was ever organised on this question (DUBOIS, 1989). Working on a list of synonymy of Oriental amphibians we reconsidered this case under the new edition of the *Code*. This text shows an important novelty regarding the rules regulating change of precedence between synonymous nomina. The way this rule is formulated (especially mentioning “valid” rather than “available” nomina) is highly open to criticism (DUBOIS, 1999, 2005b-c), and changes in this writing should be considered in the future. Nevertheless, in the present case, this rule allows to establish the valid nomen of the species at stake without having any more to wait for an improbable vote of the Commission.

Article 23.9.1 gives the conditions when prevailing usage must be maintained “the senior synonym or homonym has not been used as a valid name after 1899” (Article 23.9.1.1), and “the junior synonym or homonym has been used for a particular taxon, as its presumed valid name, in at least 25 works, published by at least 10 authors in the immediately preceding 50 years and encompassing a span of not less than 10 years” (Article 23.9.1.2). In order to apply Article 23.9.1, an author must cite the two nomina together and state explicitly that the junior nomen is valid and that the action is taken in accordance with this Article. In particular it must be stated that Article 23.9.1 applies and that conditions of Article 23.9.1.2 are met.

Considering the usage of the nomina *Rhacophorus moschatus* and *Hyla reinwardtii*, the conditions of Article 23.9 are clearly met for both nomina. The nomen *Rhacophorus moschatus* has never been used as valid nomen for these tree-frogs; all authors who mentioned this

nomen considered it as invalid (DUBOIS, 1982, 1989, FROST, 1985, ZHAO & ADLER, 1993). On the other hand, *Hyla reinwardtii* (as *Rhacophorus reinwardtii*) has been used largely, in particular in faunal lists, field guides, books on amphibian biology and general zoology. This species is well-known also by non-specialists, as it is one of those that have a particular mode of aerial locomotion, gliding in the canopy of primary forests. A list of 25 publications, by 25 independent authors (sensu DUBOIS, 2005c), citing the nomen *Rhacophorus reinwardtii*, is provided in Appendix 1. Among hundreds, these references were chosen in order to represent a great variety of countries and of works, to corroborate large acceptance.

Having met conditions given in Article 23 9 of the *Code*, the nomen *Hyla reinwardtii* has precedence over *Rhacophorus moschatus*. This action only considers precedence but not availability in the case where synonymy of both nomina should be questioned. As a matter of fact, some authors (VAN KAMPEN, 1923: 254, AHL, 1931: 148, WOLF, 1936: 187) suggested that *R. moschatus* might be the species later called *Hyla margaritifera* Schlegel, 1844, and also *Hyla javanus* Boettger, 1893. In such a case the nomen *Rhacophorus moschatus* would remain available for possible "resurrection", as is explicitly stated in Article 23 9.2. Stabilisation of the status of this nomen would require designation of a neotype, as the original syntypes are lost (BRONGERSMA, 1942).

In the publication where the nomen *Hyla reinwardtii* was made nomenclaturally available, SCHLEGEL (1840) provided figures of three specimens, thus pointing to morphological and color variation in this group. CHAN-ARD et al (1999) also documented this variation, as they showed a photo of a specimen which they only tentatively recognized as being a member of *R. reinwardtii*. Should this variation reflect specific differentiation, the nomen *Rhacophorus moschatus* could possibly be available for one of the taxa. A modern revision of the species group using etho-ecological, genetic and molecular characters might redefine species limits. In this perspective, it is important to stabilise the nomenclatural status of the nomen *Hyla reinwardtii* Schlegel, 1840. As the nomen is available from the *Abbildungen*, only the specimens originally illustrated in the latter are syntypes. These specimens are still extant and kept in the collections of the Nationaal Natuurhistorisch Museum (formerly Rijksmuseum van Natuurlijke Historie), Leiden, Netherlands (RMNH). Plate 30 of SCHLEGEL (1840) shows three specimens: figures 1 and 2 correspond to RMNH 6517 A, figure 3 to RMNH 3899 and figure 4 seems to be painted on the model of RMNH 1970 A. Only these three specimens are syntypes of this nominal species, and not the two additional specimens in the Leiden Museum listed by FROST (1985: 547) as syntypes (RMNH 1870.B and 6517 B). We hereby designate the specimen RMNH 6517 A as lectotype. This choice is justified as only this specimen in SCHLEGEL's plate (1840) clearly corresponds to the current concept of the species. This specimen is from Java, so there is a type-locality indication. We provide below in Appendix 2 a description and a photograph (fig. 1) of this specimen.

For the time being, the synonymy of *Rhacophorus reinwardtii* is as follows:

***Rhacophorus reinwardtii* (Schlegel, 1840)**

[Reinwardt's Flying Frog, Green Flying Frog, Black-webbed Treefrog]

*Rhacophorus moschatus* Kuhl & Van Hasselt, 1822a: 104. - **Nomen oblitum.** **Onomatophore:** syntypes unknown. **Type-locality:** near Rosamelan forest, region of Gunung

Pangerango (106°57'E, 06°46'S), near Bogor [Buitenzorg], Java, Indonesia. **Synonymy:** BRONGERSMA (1942: 345). – **Comments:** BRONGERSMA (1942) considered the specimen of figure 4 in SCHLEGEL (1840) as one of the syntypes of this nominal species. This specimen closely resembles in color pattern RMNH 1970 A, which cannot be a syntype as it has not been collected by Kuhl but by S. Müller in Sumatra, according to the RMNH catalogue.

"*Rhacophorus reinwardti*" Kuhl & Van Hasselt, 1822a: 104 **Nomen nudum.**

"*Rhacophorus rheinwardti*" Kuhl & Van Hasselt, 1822b: 476. – **Nomen nudum.**

"*Hypsiboas reinwardtii*" Wagler, 1830: 200. – **Nomen nudum.**

*Hyla reinwardti* Schlegel, 1840: 105. **Nomen protectum.** – **Onomatophore:** lectotype, by present designation (see Appendix 2 below), RMNH 6517.A, adult female. – **Type-locality:** Java, Indonesia.

*Rhacophorus reinwardtii:* DUMÉRIE & BIBRON, 1841: 532.

*Polypedates reinwardtii.* SIEDLECKI, 1909: 704

*Rhacophorus reinwardti:* VAN KAMPEN, 1910: 43.

*R[hacophorus] (R[hacophorus]) reinwardti:* AHL, 1931: xii, 60, 171.

*Rhacophorus (Rhacophorus) reinwardti:* DUBOIS, 1987: 77.

? *Rhacophorus reinwardti* var. *lateralis* Werner, 1900: 495 [nec *Rhacophorus lateralis* Boulenger, 1883: 162] **Onomatophore:** holotype, Naturhistorisches Museum, Basel, Switzerland (NHMB) 1192, adult female (FORCART 1946: 132) **Type-locality:** Batu Bara, Laut Tador, Sumatra, Indonesia. – **Synonymy:** WOLF (1936: 213).

## RÉSUMÉ

En raison de l'article 23.9.1 du *Code International de Nomenclature Zoologique*, le nomen *Rhacophorus moschatus* Kuhl & Van Hasselt, 1822 doit être considéré comme un nomen oblitum et le nomen *Hyla reinwardti* Schlegel, 1840, son synonyme subjectif plus récent, comme le nomen valide de la Rainette parachute de Reinwardt. Une liste de références de travaux dans lesquels le nomen *Rhacophorus reinwardti* est employé comme nomen valide permet de démontrer l'importante utilisation de ce nomen. Un lectotype est désigné pour ce nomen et sa description et figure sont données.

## ZUSAMMENFASSUNG

Aufgrund des Artikels 23.9.1 des *International Code of Zoological Nomenclature* sollte der Name *Rhacophorus moschatus* Kuhl & Van Hasselt, 1822 als nomen oblitum betrachtet werden und der Name *Hyla reinwardti* Schlegel, 1840, sein jüngeres subjektives Synonym, sollte der valide Name des Reinwardtschen Flugfrosches sein. Eine Liste von Werken, in denen der Name *Rhacophorus reinwardti* als valider Name gebraucht wird, soll die breite Anerkennung des Namens bezeugen. Ein Lectotypus für diesen Namen wird designiert und seine Beschreibung und Abbildung werden gegeben.

## ACKNOWLEDGEMENTS

We acknowledge Michèle Lenoir and her staff for facilitating access to the historical collection of the Bibliothèque Centrale du Muséum (Paris). We are grateful to Franco Andreone and Victoire Koyamba for their help in bibliographic research.

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## APPENDIX I

LIST OF 25 REFERENCES OF GENERAL WORKS USING THE NAME *RHACOPHORUS REINWARDII*

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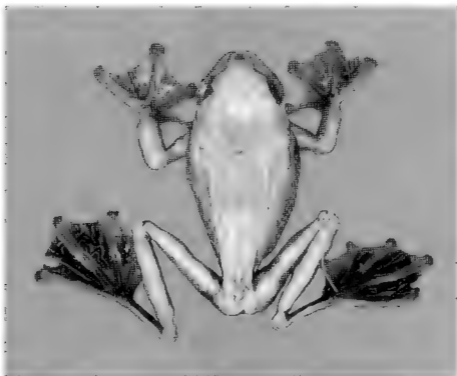


Fig 1 Lectotype of *Hyla reinwardtii* S.blegel, 1840, RMNH 6517 A, in dorsal view

## APPENDIX 2

### DESCRIPTION OF LECTOTYPE OF *HYLA REINWARDTII*

To facilitate comparisons, the format of this description is the same as in our other recent descriptions of Oriental Amphibia, especially of the genus *Rhacophorus* (OHLER & DELORME, 2006). Measurements were taken in mm. They are designated by the following abbreviations: SVL: snout vent length. *Head*: HW: head width, HL: head length (from back of mandible to tip of snout); MN: distance from back of mandible to nostril, MFE: distance from back of mandible to front of eye, MBE: distance from back of mandible to back of eye; IFE: distance between front of eyes; IBE: distance between back of eyes, IN: internarial space, EN: distance from front of eye to nostril, EL: eye length, SN: distance from nostril to tip of snout, SL: distance from front of eye to tip of snout; TYD: greatest tympanum diameter, TYE: distance from tympanum to back of eye, IUE: minimum distance between upper eyelids, UEW: maximum width of inter upper eyelid. *Forearm*: HAL: hand length (from base of outer palmar tubercle to tip of toe), FLL: forelimb length (from elbow to base of outer tubercle), TFL: third finger length (from base of first subarticular tubercle), pa1-pa4: width of pads of finger I to IV, wa1-waIV: width of fingers I to IV. *Hindlimb*: FL: femur length (from vent to



knee), TL: tibia length; FOL: foot length (from base of inner metatarsal tubercle to tip of toe); FTL: fourth toe length (from base of first subarticular tubercle to tip of toe), ppl-ppv: width of pads of toes I to V; wpl to wpv: width of toes I to V; IMT: length of inner metatarsal tubercle; ITL: inner toe length. *Webbing*: MTF: distance from distal edge of metatarsal tubercle to maximum incurvation of web between third and fourth toe; FTTF: distance from maximum incurvation of web between third and fourth toe to tip of fourth toe; MTF: distance from distal edge of metatarsal tubercle to maximum incurvation of web between fourth and fifth toe, FTF: distance from maximum incurvation of web between fourth and fifth toe to tip of fourth toe).

Lectotype of *Hyla renwardtu* Schlegel, 1840, by present designation, RMNH 6517 A, adult female (fig. 1). Poor preservation, specimen stuffed and dried.

(A) *Size and general aspect* (1) Specimen of moderate size (SVL 69.3 mm), body rather robust.

(B) *Head*. (2) Head moderate, as long (HL 23.4 mm) as wide (HW 23.3 mm; MN 19.5 mm; MFE 15.7 mm; MBE 8.4 mm), flat. (3) Snout rounded, not protruding; its length (SL 10.53 mm) longer than horizontal diameter of eye (EL 9.47 mm). (4) Canthus rostralis rounded, loreal region convex; obtuse in cross section. (5) Interorbital space convex, larger (IUE 6.84 mm) than upper eyelid (UEW 5.26 mm) as large as internarial distance (IN 6.79 mm); distance between front of eyes (IFE 14.1 mm) about two thirds of distance between back of eyes (IBE 21.9 mm). (6) Nostrils rounded, without flap of skin; as close to tip of snout (NS 5.93 mm) as to eye (EN 5.66 mm). (7) Pupil indistinct. (8) Tympanum (TYD 5.53 mm), distinct, oval, oblique; tympanum-eye distance (TYE 0.92 mm) one fifth its diameter. (9) Pinal ocellus absent. (10) Vomerine ridges not observed. (11) Tongue not observed. Tooth-like projection on maxilla absent.

(C) *Forelimbs*. (12) Arm rather short, thin, fore-arm (FLL 13.7 mm) shorter than hand (HAL 22.1 mm), not enlarged. (13) Fingers I and II rather long, thin; fingers III and IV long and thin (TFL 12.4 mm). (14) Relative length, shortest to longest,  $I < II < IV < III$ . (15) Tips of fingers I to IV rounded, enlarged, circum-ventral discs on fingers I to IV, very wide compared to finger width (paI 2.92 mm, waI 1.56 mm, paII 3.76 mm, waII 1.94 mm, paIII 4.15 mm, waIII 2.59 mm, paIV 4.41 mm, waIV 2.40 mm). (16) Fingers with webbing:  $I-2-1$  II 0-0 III 0-0 IV (17) Subarticular tubercles present, poorly distinct, rounded, single, proximal tubercle of fingers III and IV small and flat. (18) Prepollex oval, very prominent; palmar tubercle indistinct.

(D) *Hindlimbs*. (19) Shank six times longer (TL 32.8 mm) than wide (TW 5.3 mm), shorter than thigh (FL 35.5 mm) but as long as distance from base of internal metatarsal tubercle to tip of toe IV (FOL 33.0 mm). (20) Toes long, thin, toe IV (FTL 17.9 mm) longer than third of distance from base of tarsus to tip of toe IV (TFOL 48.2 mm). (21) Relative length of toes, shortest to longest,  $I < II < V < III < IV$ . (22) Tips of toes rounded, enlarged, circum-ventral grooves on toes I to V (ppl 2.40 mm, pwI 1.30 mm; pplI 2.27 mm, pwII 1.62 mm, pplII 2.98 mm, pwII 1.94 mm, pplIII 3.50 mm, pwIII 1.94 mm, pplIV 3.50 mm, pwIV 1.94 mm, pplV 2.98 mm, pwV 1.94 mm). (23) Webbing complete:  $I-0$  II  $0-0$  III  $0-0$  IV  $0-0$  V (MTF 23.1 mm, MTF 25.5 mm, FTTF 7.8 mm; FTF 13.4 mm). (24) Dermal fringe along toe V from tip of toe along toe, continuing on tarsus to heel, well developed. (25) Subarticular tubercles present, distinct, rounded, simple, al. present. (26) Inner metatarsal tubercle short, distinct, its length

(IMT 2.50 mm) 4 I times in length of toe I (ITL 10.26 mm). (27) Tarsal fold absent. (28) Outer metatarsal tubercle, supernumerary tubercles and tarsal tubercle absent.

(E) *Skin* (29) Dorsal and lateral parts of head and body smooth, flanks with small glandular warts getting larger ventrally. (30) Dermal folds on forearm, heel, tarsus, metatarsus and vent; latero-dorsal folds absent; "Fejervaryan" line absent; lateral line system absent; supra-tympanic fold absent; cephalic ridges absent; co-ossified skin absent. (31) Dorsal parts of limbs smooth. (32) Ventral parts of head, body and limbs: throat and chest smooth; belly and thigh covered with treefrog belly skin. (33) Macroglads absent.

(F) *Coloration in alcohol* (34) Dorsal and lateral parts of head and body, dorsal parts of head and body and upper part of flank creamy white; lower part of flank brown with whitish spots corresponding to glandular warts; loreal region, upper lip, tympanic region and tympanum creamy white. (35) Dorsal parts of limbs creamy white; posterior part of thigh brown. (36) Ventral parts of head, body and limbs: throat, margin of throat and chest white, belly and thigh brown with white spots corresponding to glandular warts; webbing between toes I and II creamy white; other toes dark brown with whitish longitudinal bands.

(G) *Secondary sexual characters*. Not observed.

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